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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/500,318	05/09/2005	Andrew Peter Knights	SGU-0068	9105

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EXAMINER	
KIANNI, KAVEH C	
ART UNIT	PAPER NUMBER
2883	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/02/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/500,318	KNIGHTS ET AL.	
	Examiner	Art Unit	
	Kianni C. Kaveh	2883	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 December 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *44-85* is/are pending in the application.

4a) Of the above claim(s) *46-67 and 85* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *44-59, 61-63, 76, 78-80 and 84* is/are rejected.

7)☒ Claim(s) *44-46, 60, 68-75, 77 and 81-83* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 June 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Applicant's election with traverse of claims 44-63 and 68-84 in response submitted is acknowledged. The traversal is on the ground(s) that search and the examination of the entire application can be made without serious burden. This is not found persuasive because the process and the product claims as well as species Groups 1A and IB are directed to inventions that have at least a limitation that is not found in other groups and that each group invention requires a different search than that of the other group inventions. The requirement is still deemed proper and is therefore made FINAL.

Drawings

Figures 18 and 20 should be designated by a legend such as --prior Art- because only that which is old is illustrated. See MPEP j 608.O2(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an

application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

Claims 44-46 are objected to because of the following informalities:

In claim 44:

The lack of antecedent basis for: 'the magnitude'

In lines 8-9 of the claim the presence of parenthesis '(' and ')' in the claim is improper and need to be taken out or be changed to ','

In claims 45, 'the intrinsic' lack of antecedent basis

In claim 46 'the crystalline' lack of antecedent basis

Allowable Subject Matter

Claims 60, 68-75, 77 and 81-83 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 60, 68-75, 77 and 81-83 are allowable because the prior art of record, taken alone or in combination, fails to disclose or render obvious their respective claim limitations in combination with the rest of the limitations of the base claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 44-59, 61-63, 76, 78-80 and 84 are rejected under 35 U.S.C. 103(a) as being unpatentable over combination of Giboney (US 2004/0119129, and equivalently to US 6831309) and disclosed prior art by the Applicant within the specification (see at least disclosure regarding conventional features of fig. 18 and 20).

Regarding claims 44 and 61-63, 78-80 and 84, Giboney teaches an integrated optical waveguide having an in-line light detector integrally formed therewith (shown in at least fig. 2 and see 0010), comprising:

a first part of the waveguide leading to a photodiode portion thereof (see 0036-0037, wherein conduction band matching layer/photodiode, not illustrated in fig. 2A, is n and p doped regions disposed between layers 122 and 114); a second part of the

waveguide leading away from the photodiode portion , the material from which said first and second parts of the waveguide are formed having an energy band gap the magnitude of which corresponds to absorption of photons of a first wavelength (see 0030),

the photodiode portion comprising one or more regions of light absorbing material within the waveguide arranged to absorb a minor proportion of light of one or more selected wavelengths transmitted along the waveguide (so a major proportion of the light passes through to the second part of the waveguide) (0066) to thereby generate free charge carriers within the photodiode portion of the waveguide (see at least 0056 and 0066-0069), the photodiode portion being modified to introduce deep band gap levels therein so as to provide at least partial absorption of photons of a selected wavelength or wavelength band greater than said first wavelength (see 0033); and detecting means for detecting the presence of said free charge carriers (see at least fig. 7 and 0073).

However, Goboney does not specifically state that the above light detector is light sensor and which is formed of silicon and/or on a silicon-on-insulator chip, and in which the selected wavelength band is around 1.3 or 1.5 microns; having two or more in-line light sensors arranged in series or in parallel; in which each in-line light sensor is arranged to be sensitive to a different wavelength or wavelength band; arranged in series along a substantially straight line conductive path; arranged to form an optical channel monitor for monitoring the individual channels of a multi-wavelength optical signal. Nevertheless, Goboney states that one skilled in the art can readily determine

a suitable choice of material (see 0040) and the Photodetector performance is often summarized in terms of bandwidth efficiency, maximum current output, and optical wavelength range which is a measure of a speed of response of the photodetector to changes in an incident optical signal or light source (see 0003); and Such a photodiode would solve a longstanding need in the area of photodiodes for optical networking (0007), having two or more in-line light sensors in which each in-line light sensor is arranged to be sensitive to wavelength or wavelength band (shown in at least fig. 1a-b); arranged in series along a substantially straight line conductive path (shown in at least fig. 1a-b). The above limitations are more specifically taught by disclosed prior art by the Applicant in the specification, in which having two or more in-line light sensors arranged in series or in parallel (conventional as stated in the application specification related to fig. 18 parag. 0122) ; in which each in-line light sensor is arranged to be sensitive to a different wavelength or wavelength band (conventional as stated in the application specification related to fig. 18 parag. 0122); arranged in series along a substantially straight line conductive path (conventional as stated in the application specification related to fig. 18 parag. 0122, 0026); arranged to form an optical channel monitor for monitoring the individual channels of a multi-wavelength optical signal (conventional as stated in the application specification related to fig. 18 and 20, parag. 0026 and 0028). The Applicant also states that such material and which is formed on a silicon-on-insulator chip is widely conventional (see application parag. 0038). Thus, it is obvious/well-known to those of ordinary skill in the art when the invention was made that a capability associated with detection of presence of light

is/known as sensing light and that it is obvious to a person of ordinary skill in the art that the detection of such wavelength band is extremely conventional (see prior art list) and it is within capability of the photodiode to perform in the optical communication network and silicon is extremely convention material for the choice of waveguide and/or formed on a silicon-on-insulator chip, and in which it would have been obvious to a person of ordinary skill in the art when the invention was made to add and/or modify Giboney's waveguide sensor structure with the conventional features admitted as prior art by the Applicant in order to provide a wavguide sensing structure that includes the above limitations since such waveguide with the sensor structure provides detecting incident light mono and/or bipolar photodiode (see 0010-0030).

Giboney further teaches the modification comprises the presence of defects in the intrinsic region (see 0076; wherein wells and/or holes are defects);
in which the defects comprise defects in the crystalline structure of the photodiode portion (see 0076; wherein wells and/or holes are defects created by doping); in which the defects comprise elemental impurities within the photodiode portion (see 0076; wherein defects and/or holes are defects created by doping); in which the deep band gap levels are formed by ion implantation (see 0076; wherein wells and/or holes are defects created by doping); in which the detecting means comprises
a diode (see at least abstract); in which the diode is p-i-n diode comprising a p-doped region, and an n-doped region in electrical contact with a nominally intrinsic region begin located so the majority of light transmitted along the waveguide passes therethrough (see at least 0033); in which the nominally intrinsic region

is relatively lightly doped with p-dopant adjacent said p-doped region and n-dopant adjacent said n-doped region (see 0036-0037, wherein conduction band matching layer/photodiode, not illustrated in fig. 2A, is n and p doped regions disposed between layers 122 and 114); in which the p-i-n diode is a lateral/vertical p-i-n diode (shown in at least fig. 3); which is a rib waveguide comprising a rib projecting from a slab region (shown in at least fig. 3, 5 and 6); wherein the waveguide is a rib waveguide comprising a rib projecting from a slab region, and wherein the p- and n-doped regions are formed on opposite sides of the rib waveguide (shown in at least fig. 1b and 1a and see 0005); wherein the waveguide is a rib waveguide comprising a rib projecting from a slab region, and wherein the p-doped region is formed on one side or both sides of the rib waveguide and the n-doped region is formed on top of the rib waveguide, or vice versa (shown in at least fig. 1b and 1a and see 0005); in which the p-doped and/or n-doped regions are formed at the base of one or more recesses formed in the slab region (shown in at least fig. 1b and 1a and see 0005); in which said photodiode portion is, at least partially, within the rib of the rib waveguide (shown in at least fig. 1b and 1a); an optical attenuator for attenuating the light passing through the in-line light sensor (see 0036 and 0038; wherein reduction and or absorption of light through the sensor is attenuation of light);

Claims 44-59, 61-63, 76, 78-80 and 84 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hunsperger (US4952265).

Hunsperger teaches an integrated optical waveguide having an in-line light sensor integrally formed therewith (shown in at least fig. 1), comprising: a first part of the waveguide leading to a photodiode portion thereof; a second part of the waveguide leading away from the photodiode portion, the material from which said first and second parts of the waveguide are formed having an energy band gap the magnitude of which corresponds to absorption of photons of a first wavelength (see parag. of summary), the photodiode portion comprising one or more regions of light absorbing material within the waveguide arranged to absorb a minor proportion of light of one or more selected wavelengths transmitted along the waveguide (so a major proportion of the light passes through to the second part of the waveguide) to thereby generate free charge carriers within the photodiode portion of the waveguide, the photodiode portion being modified to introduce deep band gap levels therein so as to provide at least partial absorption of photons of a selected wavelength or wavelength band greater than said first wavelength; and detecting means for detecting the presence of said free charge carriers (see at least parag. 1-4 of detailed description).

However, Hunsperger does not specifically state that the above light detector is light sensor. It is obvious/well-known to those of ordinary skill in the art when the invention was made that a capability associated with detection of presence of light is/known as sensing light since such waveguide would provide light switching of any kind of switching circuitry (see summary, 1st parag.).

Hunsperger further teaches having two or more in-line light sensors in which each in-line light sensor is arranged to be sensitive to wavelength or wavelength band (shown in at least fig. 1a-b); arranged in series along a substantially straight line conductive path (shown in at least fig. 1a-b); in which the defects are formed by Ion/hydrogen (proton) implantation (see parag. 3) the modification comprises the presence of defects in the intrinsic region (see detail desc. 1st-8th parag.); in which the defects comprise defects in the crystalline structure of the photodiode portion (see detail desc.); in which the defects comprise elemental impurities within the photodiode portion (see 0076; wherein defects and/or holes are defects created by doping); in which the deep band gap levels are formed by ion implantation (see detail desc. 1st-4th parag.); in which the detecting means comprises a diode (see at least abstract); in which the diode is p-i-n diode comprising a p-doped region, and an n-doped region in electrical contact with a nominally intrinsic region begin located so the majority of light transmitted along the waveguide passes therethrough (see detail desc. 1st-8th parag.); in which the nominally intrinsic region is relatively lightly doped with p-dopant adjacent said p-doped region and n-dopant adjacent said n-doped region (see detail desc. 1st-3rd parag.); in which the p-i-n diode is a lateral/vertical p-i-n diode (shown in at least fig. 1); which is a rib waveguide comprising a rib projecting from a slab region (shown in at least fig. 1); wherein the waveguide is a rib waveguide comprising a rib projecting from a slab region, and wherein the p- and n-doped regions are formed on opposite sides of the rib waveguide (shown in at least fig. 1); wherein the waveguide is a rib waveguide comprising a rib projecting from a slab region, and wherein the

p-doped region is formed on one side or both sides of the rib waveguide and the n-doped region is formed on top of the rib waveguide, or vice versa (shown in at least fig. 1 and see detail desc. 1st-48th parag.)); in which the p-doped and/or n-doped regions are formed at the base of one or more recesses formed in the slab region; in which said photodiode portion is, at least partially, within the rib of the rib waveguide; an optical attenuator for attenuating the light passing through the in-line light sensor (see at least fig. 1 and detail desc. 1st-8th parag.);

Citation of Relevant Prior Art

Prior art made of record and not relied upon is considered pertinent to applicant's disclosure. In accordance with MPEP 707.05 the following references are pertinent in rejection of this application since they provide substantially the same information disclosure as this patent does. These references are:
(US-20040119129 or US-20030165314 US-6831309 or US-3952265 or US-5764826 or US-7072557 or US-6670599).

These references are cited herein to show the relevance of the apparatus/methods taught within these references as prior art.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kianni C. Kaveh whose telephone number is 571-272-2417. The examiner can normally be reached on 9:30-19:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on 571-272-2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

K. Cyrus Kianni
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K. CYRUS KIANNI
PRIMARY PATENT EXAMINER

February 26, 2007